

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of Application by)
SES AMERICOM, INC.) Call Sign E050287
To Modify its Earth Station License to Perform)
TT&C for ASTRA 3A at 86.85° W.L.)

REQUEST FOR MODIFICATION

By this application, SES Americom, Inc. (“SES Americom” or “SES”) respectfully seeks to modify its license for earth station E050287 to allow it to communicate with the ASTRA 3A spacecraft in order to provide Tracking, Telemetry and Command (“TT&C”) following relocation of the satellite from 176.85° W.L. to 86.85° W.L. (+/- 0.10° east/west stationkeeping). The satellite is expected to arrive at 86.85° W.L. on or about August 15, 2016.

SES Americom’s affiliate, SES ASTRA S.A. (“SES ASTRA”), holds an authorization from the Luxembourg Ministry of State, Office of Media and Communications¹ for the ASTRA 3A Ku-band spacecraft. SES ASTRA has requested that SES Americom assist with providing TT&C to support the planned relocation of ASTRA 3A to 86.85° W.L. Upon arrival at the nominal 87° W.L. orbital location, ASTRA 3A will join the SES-2 spacecraft and will operate in inclined orbit.

SES is not requesting U.S. market access or any other authorization from the Commission in relation to the non-U.S.-licensed ASTRA 3A spacecraft, and therefore is not

¹ Ministère d’État, Service des Médias et des Communications of the Grand Duchy of Luxembourg.

providing full technical information about the ASTRA 3A satellite as part of this application.² Details regarding the ASTRA 3A TT&C operations, including link budgets and interference analysis, are provided in Attachment 1 to this request. A basic technical description of the satellite's proposed operations, and an updated orbital debris mitigation statement for ASTRA 3A, are provided in Attachment 2 for the Commission's information. As discussed below, communications with ASTRA 3A will not adversely affect the operation of any adjacent satellites.

Grant of this Modification Request Will Serve the Public Interest. Grant of this request is in the public interest. The requested TT&C authority will facilitate the safe operation of ASTRA 3A once it relocates to 86.85° W.L.

No Harmful Interference to Other Spacecraft. Apart from SES-2, the nearest satellites to 86.85° W.L. with Ku-band operations are Intelsat's Galaxy 28 at 89.0° W.L. and the Ku-band payload of AMC-16 at 85.0° W.L., which is licensed to EchoStar. Attachment 1 demonstrates that the proposed operations comply with the Commission's two-degree spacing requirements.

Waiver Requests. SES requests limited waivers of the Commission's requirements in connection with the instant request. Grant of these waivers is consistent with Commission policy:

The Commission may waive a rule for good cause shown. Waiver is appropriate if special circumstances warrant a deviation from the general rule and such deviation would better serve the public interest than would strict adherence to the general rule. Generally, the Commission may grant a waiver of its rules in a particular case if the relief requested would not undermine the policy objective of the rule in

² See Waiver Requests, *infra*.

question and would otherwise serve the public interest.³

Sections 25.137 and 25.114. SES requests a waiver of Section 25.137 and the other Commission rules cross-referenced therein. SES seeks a modification of its authority in connection with TT&C for ASTRA 3A, a foreign-licensed spacecraft. Section 25.137 requires that applicants proposing to use U.S.-licensed earth stations to communicate with foreign-licensed spacecraft demonstrate that the Commission's policies for U.S. market access are satisfied. Section 25.137 also incorporates by reference other requirements for Commission-licensed space stations, including the obligation to file detailed technical information as specified in Section 25.114.

By its terms, Section 25.137 is inapplicable to the instant request. The rule's requirements come into play only when a non-U.S.-licensed satellite is to be used to "serve the United States."⁴ Here, the E050287 earth station will be used solely for TT&C, not for commercial operations. Thus, SES is not seeking authority to communicate with ASTRA 3A for purposes of providing U.S. service within the meaning of Section 25.137.

To the extent the Commission disagrees, SES requests a waiver of the market access and other requirements imposed in Section 25.137. Grant of a waiver will not undermine the objectives of these requirements. The market access test described in the rule is intended to ensure that U.S.-licensed systems have "effective competitive opportunities."⁵ Because SES

³ *PanAmSat Licensee Corp.*, 17 FCC Rcd 10483, 10492 (Sat. Div. 2002) (footnotes omitted).

⁴ 47 C.F.R. § 25.137(a).

⁵ *Id.*

Americom is not seeking authority to provide commercial services in the United States, the requested modification does not raise any concerns about competitive equality.⁶

Strict adherence with Section 25.114's requirements for detailed technical information is also unnecessary and would be unduly burdensome. SES Americom is proposing to use E050287 only for the limited purpose of performing TT&C for the satellite once it arrives at 86.85° W.L., and the relevant technical characteristics of those transmissions are provided below. The transmissions to the spacecraft will be conducted on a non-harmful interference basis. In these circumstances, no valid purpose would be served by requiring a complete description of the ASTRA 3A spacecraft.

SES Americom's request is consistent with Commission precedent. In similar cases in which limited communications by U.S. earth stations with a foreign-licensed satellite were proposed, the Commission has granted operational authority without requiring a market access showing under Section 25.137 or full technical data as required by Section 25.114.⁷

Section 2.106 Footnote NG52. To the extent that reception of telemetry at 11450.25 MHz and 11699.50 MHz constitutes a domestic (*i.e.*, non-international) service, SES

⁶ In any event, the ASTRA 3A spacecraft at 86.85° W.L. will be operating under the authority of Luxembourg, a WTO member country, and therefore is exempt from the requirement to make a showing of effective competitive opportunities. 47 C.F.R. § 25.137(a)(2).

⁷ *See, e.g.*, SES Americom, Inc., File No. SES-MFS-20131108-00951 (Call Sign KA288), granted Mar. 19, 2014; Hawaii Pacific Teleport, L.P., File No. SES-MFS-20131030-00913 (Call Sign E030115), granted Apr. 16, 2014 (granting authority for earth station to provide TT&C services to ASTRA 3A operating at 176.85° W.L.); PanAmSat Licensee Corp., File Nos. SES-STA-20090922-01211 (Call Sign E4132) & SES-STA-20090922-01212 (Call Sign E040125), both grant-stamped Oct. 16, 2009 (granting authority for earth stations to communicate with foreign-licensed NSS-12 spacecraft for purposes of providing launch and early operations services).

Americom respectfully requests a limited waiver of the international-service-only restriction.⁸

Such a waiver is warranted in the circumstances for the limited purpose of TT&C. As the Commission has recognized, TT&C operations generally require uplink and downlink capability from the same earth station. For this reason, the Commission has previously granted waivers of the international service restriction to enable TT&C to be performed in the U.S. using the extended Ku-band frequencies.⁹

Grant of the requested waiver would not undermine the purpose of the restriction, which is to ensure that earth station deployments in the extended Ku-band do not negatively impact the deployment of fixed service (“FS”) in the same band or cause interference to such operations. The telemetry downlink signals from ASTRA 3A in the extended Ku-band are narrow in bandwidth, and will comply with the power flux density limits in the Commission’s rules and, thus, will not interfere with FS station operations. Moreover, only a small number of U.S. earth stations will be used to perform TT&C in the extended Ku-band.¹⁰ Once ASTRA 3A is on-station at 86.85° W.L., the TT&C will be performed by two U.S. earth stations: SES Americom’s KA288 earth station in South Mountain, California, and its E050287 earth station in

⁸ 47 U.S.C. § 2.106 Footnote NG52.

⁹ See, e.g., EchoStar KuX Corporation, 20 FCC Rcd 919 (Int’l Bur. 2004) (“*EchoStar 83W Order*”); EchoStar Satellite LLC, 20 FCC Rcd 930 (Int’l Bur. 2004) (“*EchoStar 109W Order*”); EchoStar KuX Corporation, 20 FCC Rcd 942 (2004) (“*EchoStar 121W Order*”). These decisions granted waivers of the international only restriction in Footnote NG104, which has been replaced by Footnote NG52.

¹⁰ See *EchoStar 83W Order*, at ¶ 16 (“The Commission has waived this [international only] requirement where the number of potential earth stations in a particular service is inherently small.”); *EchoStar 109W Order*, at ¶ 16 (same); *EchoStar 121W Order*, at ¶ 17 (same).

Woodbine, Maryland. As a result, there will be no significant restrictions placed on the deployment of FS in this band.

Section 25.210(j). The ASTRA 3A satellite is authorized by the Luxembourg Government to operate at 86.85° W.L. within a +/- 0.10° east/west stationkeeping box. To the extent necessary, SES respectfully requests a waiver of Section 25.210(j) of the Commission's rules, which requires geostationary space stations to be operated within a +/- 0.05° east/west stationkeeping box. The Commission has previously waived this rule based on a finding that allowing an increased stationkeeping volume would "not adversely affect the operations of other spacecraft, and would conserve fuel for future operations."¹¹

The facts here fit squarely within this precedent. Allowing ASTRA 3A to be maintained within an increased stationkeeping volume will not harm other operators. ASTRA 3A's stationkeeping volume will not overlap with that of any other satellites. In addition, allowing ASTRA 3A to be flown at 86.85° W.L. in an expanded east-west stationkeeping volume of +/-0.1 degrees will result in fuel savings for the spacecraft. This will prolong the time during which ASTRA 3A will be available to provide service. Under these circumstances, grant of any necessary waiver of Section 25.210(j) will serve the public interest.

SES hereby certifies that no party to this application is subject to a denial of federal benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. § 862.

¹¹ See File Nos. SAT-MOD-20080124-00030 & SAT-AMD-20080311-00070, grant-stamped May 19, 2008, Attachment at ¶ 1.

For the foregoing reasons, SES respectfully seeks to modify its E050287 earth station license to communicate with ASTRA 3A in order to provide TT&C once it is on station, as described herein. Grant of the requested authority will promote safe operation of the satellite after its relocation.

Respectfully submitted,

SES AMERICOM, INC.

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Attachment 1: TT&C Emission Characteristics

1. Earth Station Transmission Characteristics

E050287 (Woodbine, MD -- on-station)

Emission Designator: 800KF9D

Max EIRP: 78.5 dBW

Max EIRP Density: 55.5 dBW/4kHz

These EIRP and EIRP density levels are the maximum EIRP and EIRP density levels authorized in the current E050287 earth station license.

2. TT&C Frequencies

Telecommand: 14499 MHz vertical polarization

Telemetry: 11450.25 MHz horizontal polarization

11699.50 MHz horizontal polarization

3. TT&C Link Budgets

Woodbine (E050287)

Woodbine - Telecommand		
Link Parameters	Units	800KF9D
Uplink Frequency	MHz	14499.00
Carrier Allocated Bandwidth	kHz	800.0
Uplink:		
Nominal E/S e.i.r.p. per carrier	dBW	78.5
Earth Station Diameter	m	9.2
Earth Station Gain	dBi	61.0
Uplink Input Power per Carrier	dBW	17.5
Uplink EIRP density	dBW/4kHz	55.5
Spreading Loss	dB	162.5
Other Losses	dB	1.1
SFD at satellite	dBW/m2	-85.1
CMD subsystem SFD Threshold	dBW/m2	-92.0
Margin	dB	6.9

Woodbine - Telemetry		
Link Parameters	Units	150KF9D
Downlink Frequency*	MHz	11450.25
Carrier Allocated Bandwidth	kHz	150.0
Downlink:		
Downlink e.i.r.p. (EOC)**	dBW	6.3
Free Space Loss	dB	205.1
Receive E/S Pointing Loss	dB	0.2
Receive E/S G/T	dB/K	38.0
Downlink C/No	dB	67.6
Required C/No	dB	44.5
Margin	dB	23.1

* This link budget is also valid for the 11699.5 MHz telemetry frequency.

** +/- 30 deg Earth Coverage

4. Two-Degree Interference Analysis

There is no frequency overlap between the TT&C carriers on ASTRA 3A and the spectrum used by any other spacecraft operating within six degrees of the 86.85° W.L. orbital location. Therefore, SES Americom has conducted the two-degree spacing analysis based on the assumption that ASTRA-3A has a hypothetical neighbor at an orbital separation of two degrees with the same TT&C transmission parameters as the ASTRA-3A satellite. The interference between the two systems then is only in the TT&C carriers. The tables below show the interference analysis for the telecommand and telemetry carriers, and it can be seen from the results that the C/I margins in the analyses are positive.

Woodbine (E050287)

ASTRA-3A Telecommand		
Input Power	(dBW)	17.5
Off-axis EIRP	(dBW)	38.5
Hypothetical satellite		
uplink EIRP	(dBW)	78.5
Required C/I	(dB)	15.0
Interference analysis		
Calculated C/I (single satellite)	(dB)	40.0
Calculated C/I (two satellites)	(dB)	37.0
Margin	(dB)	22.0

ASTRA-3A - Telemetry		
downlink EIRP	(dBW)	6.3
Hypothetical satellite		
Downlink EIRP (EOC)	(dBW)	6.3
Receive earth station size	(m)	9.2
Receive earth station gain	(dBi)	58.5
Receive earth station off-axis	(dBi)	21.0
Required C/I	(dB)	15.0
Interference analysis		
Calculated C/I (single satellite)	(dB)	37.5
Calculated C/I (two satellites)	(dB)	34.5
Margin	(dB)	19.5

5. Compliance with PFD limits in 11.45-11.7 GHz

The allowable PFD levels in the 11.45-11.70 GHz bands (per 4 kHz) are defined in Section 25.208(b)(1) of the Commission's rules for all conditions, including clear sky, and for all methods of modulation as follows:

1. For angles of arrival between 0 and 5 degrees above the horizontal plane: -150 dBW/m^2 in any 4 kHz band;
2. For angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane: $-150 + (\delta-5)/2 \text{ dBW/m}^2$ in any 4 kHz band; and
3. For angles of arrival between 25 and 90 degrees above the horizontal plane: -140 dBW/m^2 in any 4 kHz band.

In order to demonstrate such compliance, the PFD levels for the telemetry carriers, based on the link budgets set forth in Section 3 are calculated below. It can be seen from the results that compliance with the PFD levels has been achieved.

PFD level compliance calculation						
Angle of Arrival	Applicable PDF limit	Spreading Loss	Gain Contour	Worst case PFD	PFD Margin	
0	-150.0	-163.4	-0.2	-172.0	22.0	
5	-150.0	-163.3	-0.1	-171.8	21.8	
10	-147.5	-163.2	-0.1	-171.7	24.2	
15	-145.0	-163.0	0.0	-171.4	26.4	
20	-142.5	-162.9	0.0	-171.3	28.8	
25	-140.0	-162.8	0.0	-171.2	31.2	
Peak (90)	-140.0	-162.1	0.0	-170.5	30.5	

6. TT&C Contour Maps

SES Americom is not including antenna gain contours for the TT&C beams because the contours at 8 dB below peak fall entirely beyond the edge of the visible Earth.¹

¹ See 47 C.F.R. 25.114(c)(4)(vi)(A).

Attachment 2: Updated Orbital Debris Mitigation Statement

Information regarding the orbital debris mitigation plan for ASTRA 3A was previously submitted to the Commission in File No. SES-STA-20130722-00653, Attachment 3. The only changes to that plan are described below.

Safe Flight Profiles

ASTRA 3A will be positioned at 86.85° W.L., immediately adjacent to the SES-2 spacecraft, at the 87.0° W.L. orbital location. In considering current and planned satellites that may have a station-keeping volume that overlaps the ASTRA 3A satellite, SES has reviewed the FCC databases for FCC licensed satellite networks and those that are currently under consideration by the FCC. In addition, networks for which a request for coordination has been published by the ITU within ± 0.15 degrees of 86.85° W.L. have also been reviewed. Only those networks that either operate, or are planned to operate, and have an overlapping station-keeping volume with the ASTRA 3A satellite, have been taken into account in the analysis.

Based on these reviews, the only satellite operating near 86.85° W.L. is SES-2, which is also controlled and operated by SES. SES is not aware of any pending applications before the Commission requesting authorization to use an orbital location within $\pm 0.15^\circ$ of 86.85° W.L., and within this sub-arc, SES is not aware of any proposals by any other administration to launch or deploy a satellite to such locations in the near term.

Based on the preceding, it is concluded that physical coordination of the ASTRA 3A satellite with another party is not required at the present time.

On-station station-keeping operations will be within the ± 0.10 degree E-W control box with no inclination control, thereby ensuring adequate collision avoidance distance from other satellites in geosynchronous orbit.